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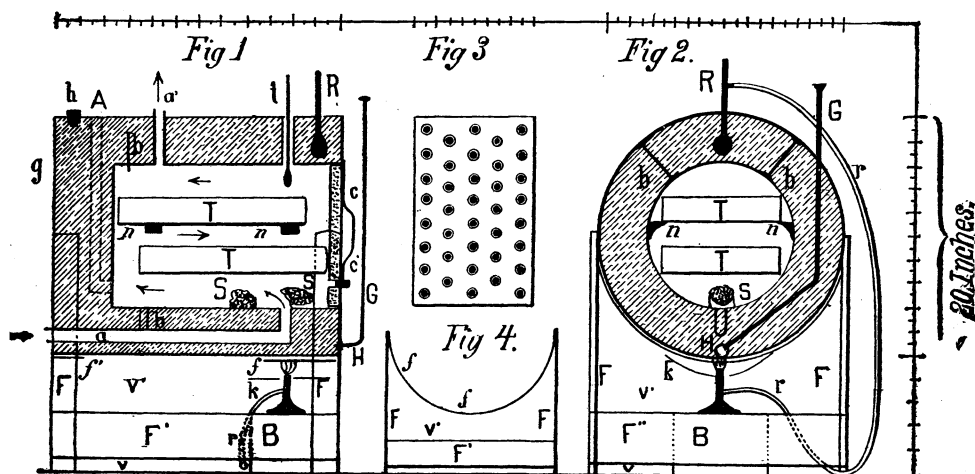
MICROSCOPY.¹

ON FIXING SECTIONS TO THE SLIDE.—Schällibaum's collodion fixative is found to be unreliable when used with the more elaborate micro-chemical reactions to which our advanced technique subjects the sections on the slide before mounting. Thus, sections fixed in this manner drop off in absolute alcohol. *Mayer's albumen fixative* is absolutely reliable, and should be used whenever sections are loosely coherent in their parts. One cannot obtain neat results with this, except by means of a very *even* and thin *film*, to secure which proceed as follows: A small drop of fixative is spread on the slide with the ball of the index finger. Excess of fixative is removed by wiping the finger dry and continuing the rubbing until no frothy streaks appear in the film. Then tap the moist surface lightly with the finger, so that by light reflected at a proper angle it appears pebbled or finely stippled. Each section is pressed into the film with a brush, and when the slide is full a piece of filter-paper is placed over all and firmly pressed with the finger until every part of each section is in even contact with the glass. Then heat the slide *over steam* until the paraffin melts, and then plunge into turpentine. The film is opaque in alcohol, but this is corrected in turpentine and mounting. Should the presence of the foreign albumen in the sections be undesirable, we have recourse to *Gaulé's* alcoholic fixative. This is no fixative in itself, but simply a means by which the albumen molecules of the section are brought into the same adhesive contact with the glass as those of ordinary fixatives. The slide is brushed over with weak alcohol (40–70 per cent.). The stronger alcohols evaporate too rapidly. The sections placed on this film flatten out beautifully and can be shoved about if alcohol enough be present. When the film has evaporated thin the sections stick with great pertinacity. Superfluous alcohol is removed with filter-paper, and the slide must then be evaporated to *dryness*. The thermostat at 40° C., for 1 to 2 hours, is most useful in securing this result. The paraffin should never be allowed to melt. It is removed by turpentine, as for other fixatives. Celloidin sections stick well with this method.—*J. Nelson, J. H. U., Balto., Md.*

A NEW LABORATORY INCUBATOR AND THERMOSTAT.—*Description of Cut*: Fig. 1, plan of longitudinal section; Fig. 2, plan of cross section; Fig. 3, view of egg-pan, from either top or bottom (dark circles are aerating-holes, $\frac{3}{8}$ in. diameter); Fig. 4, end

¹ Edited by C. O. Whitman, Milwaukee.

view of supporting frame, $\frac{1}{4}$ natural size—other figures, $\frac{1}{16}$ natural size. *Explanation of letters:* *a*, inhalent air-tube, 1 in. diameter; *a'*, exhalent air-tube; *B*, block supporting Bunsen burner; *b, b*, braces holding interior drum against upward pressure of the water; *c*, cover fitting into the end of interior drum or brood-chamber; *c'* (placed near lower end of handle of cover), cork-stopper fitting into a thermometer-hole through the cover; *F*, upright pieces of supporting frame; *F'*, *F''*, side and end base-boards of supporting frame; *f*, fire-plate, portion of *f* the supporting belt; *G*, glass



tube fitting through cork in hole; *H*, used as a water-gauge and for emptying reservoir; *h*, opening for filling reservoir; *K*, fire-screen; *n, n*, brackets supporting upper shelf or egg-tray; *R*, regulator; *r*, rubber tube carrying gas from regulator to burner; *s, s*, sponges in cups of water for keeping air moist; *T, T*, egg-trays; *t*, thermometer for brood-chambers; *v', v'*, spaces between uprights of frame covered by sheets of tin; *v*, space below foot-boards for ingress of air, tubing, etc. The tube *A* is not essential, but may be convenient at times, as seen below.

The structure is essentially a water-jacketed bucket, made by fitting a smaller cylinder or drum 16x19 in. inside a larger drum 20 in. in diameter by 24 in depth, thus leaving the space shaded in the cut for water. The cover has a double wall with air space (dotted in Fig. 1). It slips into its place like the cover of a tin pail. With only the tube *A*, and properly supported in the upright position, the gas-flame burning at *g*, the hole *c'* open, and a regulator at *H*, we have the essentials of a laboratory incubator. The air passing through the tube—surrounded by warm water for a considerable distance—is so warmed as not to chill the eggs placed in the brood-

chamber. This was the form devised several years ago by Professor Birge, of Madison, Wisconsin, and because for laboratory purposes comparatively few eggs are needed, and principally the earlier stages of development, we secure an efficient incubator and thermostat at a trifling cost. (Made of sheet-tin, the cost is not over five dollars.)

By modifying this form I have made a more elaborate, but more convenient, machine, which, having successfully stood the test of three seasons' work at the Johns Hopkins Laboratory, I venture to describe. The "drum" was placed in a horizontal position, the tube *a* was added (making *A* superfluous). Apertures *h* and *R* and tubes *a'* and *t* were also added, as shown in the figures. The "drum" was supported by a frame similar to what we get by taking off the top of a table and turning the rest upside down. The legs or uprights at each end were joined by a strip of sheet-iron 2 in. wide, forming a saddle-like belt. The forward end-strip, being cut six inches wide at its middle point, makes a fire-plate for the flame to play on. The point *s* tends to be the coolest; hence the position of the burner. The thermometer *t* should mark the upper limit of the incubation temperature. A sheet of tin is hung by wires, so that the Bunsen burner projects through a hole punched in it, and thus prevents reflection and loss of heat into the surrounding space. The whole structure should rest on a plate of zinc if the floor or table on which it stands is of wood. A coat of paint on the drum reduces radiation and consequent gas-consumption. The eggs are placed in pans 2 inches deep by 10 by 16. Each pan is made of two similar halves that slip one over the other, like the lid of a cardboard box. Thus either side may be up or down, and therefore all the eggs in the pan (forty or more) are turned at once by turning the pan, and, besides, the marks on the eggs are easily inspected. For ordinary thermostat purposes, the trays can be replaced by shelves or drawers. The air circulates in part as indicated by the arrows, with such an arrangement of the pans as shown in the cut, but most of the air passes through the trays directly, and, thus, between the eggs.

If a space be left above the water and the hole *h* be made to connect with an aspirator, on the one hand, and the tube *A* on the other, warm, moist air can be forced into the egg-chamber; but the sponges *s*, *s*, are practically sufficient. I found by experience that even though the cylindrical shape is the one giving greatest strength (as well as ease of construction), that zinc is not a good material for this machine to be made from, as it softens under warmth and yields gradually to the pressure. Therefore, if tin be departed from, copper should be chosen; but, of course, this will raise the price.—*J. Nelson.*